What is claimed is:

1. A conversion integrated circuit (IC) for RF signals, comprising;

a first interface for transmitting or receiving signals in a broadband spectrum;

sideband selection circuit elements coupled to the first interface for up-conversion or down-conversion of the signals to and from an intermediate frequency (IF);

a second interface coupled to said circuit elements for receiving and transmitting at the intermediate frequency (IF); and

an on-chip voltage-controlled oscillator (VCO) coupled to at least one of the circuit elements through one of frequency multiplication or division circuitry for generating a local-oscillator (LO) signal to that circuit element for conversion between the IF frequency and the receive or transmit frequency in the broadband spectrum.

2. The IC of claim 1 wherein the on-chip VCO is coupled to two or more of the circuit elements, providing a different frequency to each.

3. The IC of claim 1 wherein the broadband spectrum is divided into distinct sub-bands, each coupled to one of the sideband selection circuit elements.

4. The IC of claim 1 wherein the VCO, through frequency multiplication or division provides the LO frequency for up-conversion or down-conversion to three or more of the sideband selection circuit elements.

5. The IC of claim 1 dedicated to down-conversion of the RF frequency bands.

6. The IC of claim 1 dedicated to up-conversion of the RF frequency bands.

7. The IC of claim 1 having circuit elements for both up-conversion and down-conversion.

8. A broadband receiving/transmitting system, comprising:

an antenna for receiving or transmitting RF signals in a broadband spectrum;

a conversion integrated circuit (IC) coupled to the antenna by a first interface of the IC; and

modulation circuitry coupled to the IC by a second interface of the IC for receiving or transmitting each of the bands at a common intermediate frequency (IF);

characterized in that the conversion IC comprises a first interface for transmitting or receiving signals in a broadband spectrum, sideband selection circuit elements coupled to the first interface for up-conversion or down-conversion of the signals to and from an intermediate frequency (IF), a second interface coupled to the circuit elements for receiving and transmitting at the intermediate frequency (IF), and an on-chip voltage-controlled oscillator (VCO) coupled to at least one of the circuit elements through one of frequency multiplication or division circuitry for generating a local-oscillator (LO) signal to that circuit element for conversion between the IF frequency and the receive or transmit frequency in the broadband spectrum.

9. The system of claim 8 wherein the on-chip VCO is coupled to two or more of the circuit elements, providing a different frequency to each.

10. The system of claim 8 wherein the broadband spectrum is divided into distinct sub-bands, each coupled to one of the sideband selection circuit elements.

11. The system of claim 8 wherein the VCO, through frequency multiplication or division provides the LO frequency for up-conversion or down-conversion to three or more of the sideband selection circuit elements.

12. The system of claim 8 dedicated to down-conversion of the RF frequency bands.

13. The system of claim 8 dedicated to up-conversion of the RF frequency bands.

14. The system of claim 8 having circuit elements for both up-conversion and down-conversion.

15. A method for providing local oscillator (LO) signals to one or more sideband-selection circuit elements in up-conversion or down-conversion circuitry for a broadband spectrum, comprising the steps of:

(a) providing an on-chip voltage-controlled oscillator (VCO); and

(b) coupling the VCO to the one or more circuit elements using frequency multiplication or division.

16. The method of claim 15 wherein the on-chip VCO is coupled directly to one of the circuit elements and to at least one other through frequency multiplication or division technique.

17. The method of claim 15 wherein the broadband spectrum is divided into distinct sub-bands, each coupled to one of the sideband selection circuit elements.

18. The method of claim 15 wherein the VCO, through frequency multiplication or division provides the LO frequency for up-conversion or down-conversion to three or more of the sideband selection circuit elements.

19. The method of claim 15 dedicated to down-conversion of the RF frequency bands.

20. The method of claim 15 dedicated to up-conversion of the RF frequency bands.

21. The method of claim 15 enabled for both up-conversion and down-conversion.